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# A New Species of *Muelleria* (Millettieae, Leguminosae) from Brazil

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**ABSTRACT.** *Muelleria tozziana* M. J. Silva (Millettieae, Leguminosae), a new species endemic to Brazil, is described and illustrated on the basis of field studies during the taxonomic revision of the genus. The species is morphologically similar to *M. denudata* (Benth.) M. Sousa, but it differs and can be characterized by its falcate or oblong-falcate fruits, glabrescent with upper margin discreetly thickened; the pubescent staminal tube and free portion of the filaments and anthers; subtruncate calyx, and delicate leaves.

**RESUMO.** *Muelleria tozziana* M. J. Silva (Millettieae, Leguminosae), uma nova espécie endêmica para o Brasil, é descrita e ilustrada baseada em estudos de campo durante a revisão taxonômica do gênero. A espécie é morfologicamente semelhante a *M. denudata* (Benth.) M. Sousa, mas difere e pode ser caracterizada pelos frutos falcados a oblongo-falcados, glabrescentes e levemente espessados na margem superior, tubo estaminal, porção livre dos filetes e anteras pubescentes, cálice subtruncado e folhas delicadas.

**Key words:** Brazil, IUCN Red List, Leguminosae, Millettieae, *Muelleria*.

*Muelleria* L. f. (Millettieae, Leguminosae) is a Neotropical genus traditionally comprised of the two species *M. monilis* (L.) M. J. Silva & A. M. G. Azevedo and *M. fluvialis* (Lindm.) Burkart that are morphologically similar to members of *Lonchocarpus* Kunth sect. *Laxiflori* (Taub.) Benth. and, therefore, sometimes have been included in that taxon (e.g., Geesink 1981, 1984; Tozzi, 1989, 1992; Fortunato & Palese, 1997). Other authors have treated *Muelleria* as a separate genus (e.g., Hermann, 1949, 1965; Burkart, 1969; Polhill, 1981; Schrire, 2005).

Molecular and morphological phylogenetic studies carried out by Silva et al. (2012) on *Lonchocarpus* s.l. showed the paraphyletic origin of the genus, with three main subclades that were morphologically and geographically well defined. One of these subclades, the informally named *Muelleria* subclade, included the two species *L. monilis* (L.) A. M. G. Azevedo and *L. fluvialis* (Lindm.) Fortunato & Palese, which were placed in *Lonchocarpus* sect. *Laxiflori* (Benth.) Taub.

by Tozzi (1989), as well as the genera *Margaritobium* Harms and *Bergeronia* Micheli. Based on such phylogenetic evidence, Silva et al. (2012) re-established the genus *Muelleria*, which differs from *Lonchocarpus* by its delicate flowers in pairs along the rachis, the bracteoles being subopposite and located above the middle of the pedicel, the indehiscent fruits with the upper margin not keeled, and the free portion of the staminal tube and anthers being usually pubescent. In *Lonchocarpus*, the flowers are not delicate; the pseudoraceme has a pair of pedicelled flowers on the top of a short branch, similar to the letter Y; the bracteoles are opposite and allocated on the base of the calyx or in the middle of the pedicel; the fruits are usually keeled along the upper margin; and the staminal tube and anthers are commonly glabrous. *Muelleria* as now recircumscribed includes 26 species and is mainly South American (Silva, pers. obs.). During the taxonomic revision of *Muelleria* by Silva (2010), additional species were discovered, one of which is described and illustrated herein.

***Muelleria tozziana*** M. J. Silva, sp. nov. TYPE: Brazil. Pará: Tucuruí, Breu Branco, igapó às margens do Rio Tocantins, 10 Sep. 1983 (fl.), F. E. Miranda, J. Ramos, E. Lima & A. Silva 538 (holotype, INPA; isotypes, NY, NY photo). Figure 1.

Species nova *Muelleriae denudatae* (Benth.) M. Sousa similis, sed ab ea legumine falcato vel oblongo-falcato glabrescente, calyce campanulato subtruncato et tubo staminali filamentis necnon antheris pubescentibus differt.

Shrub or slender treelets, 1.5–6 m tall, branches terete, light to dark brown when mature, glabrous, with small lenticels when young, sparsely puberulent or glabrescent. Leaves 7-foliolate, rarely 5- to 9-foliolate; pulvinus 1–1.2 mm; petiole 1–2.1 cm, rachis 2.5–4.5 cm, both subquadrangular, conspicuously canaliculate above, delicate, striate longitudinally, glabrescent; petiolule 1.7–2 mm, transversally rugose, glabrescent, trichomes hyaline; stipules caducous; leaflets 2.5–5.4 × 1.8–2.6 cm, opposite to subopposite in first and second pairs, predominantly orbicular to rounded, rarely ovate-elliptic or elliptic, base oblique to cuneate, apex predominantly



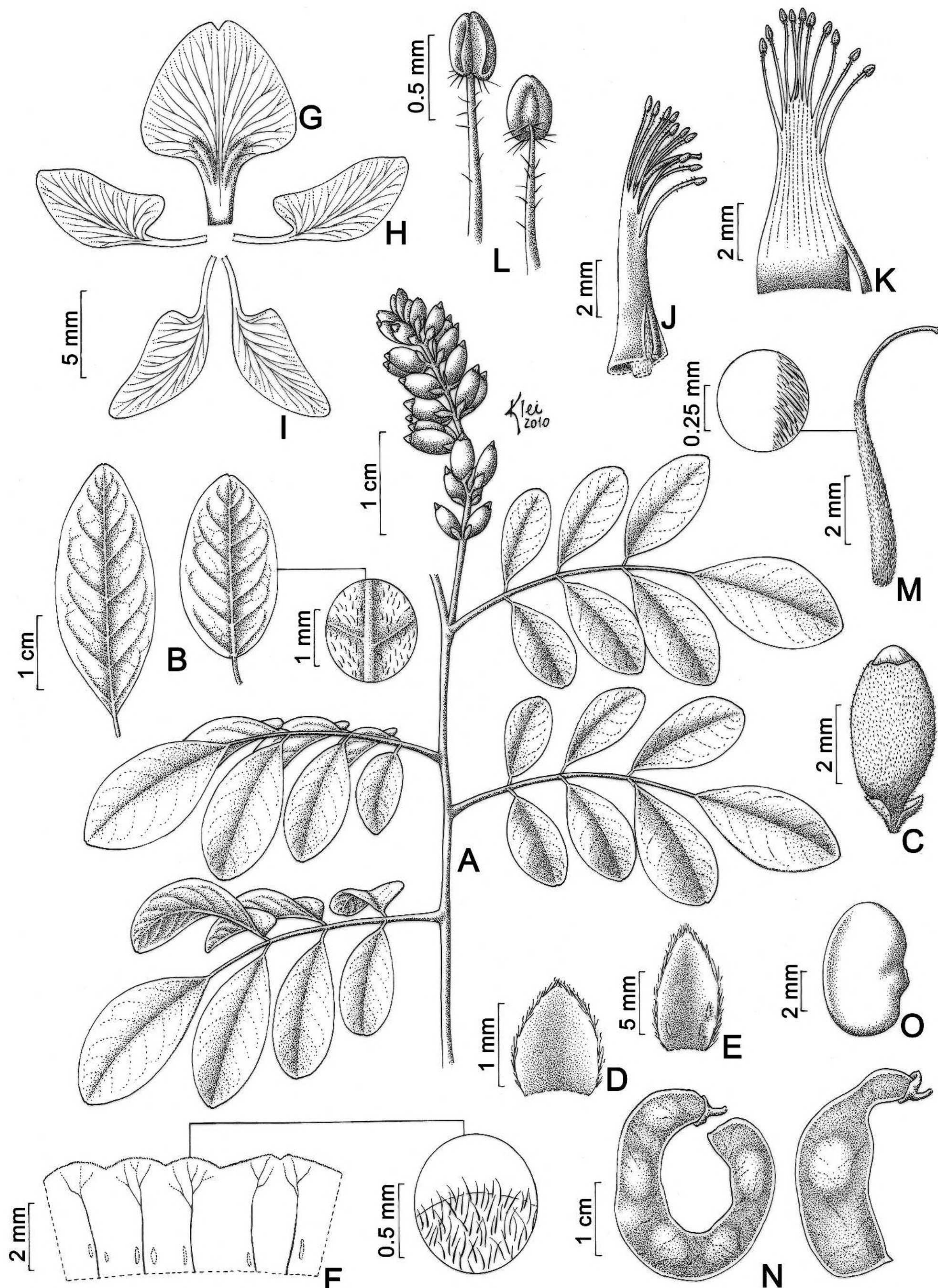


Figure 1. *Muelleria tozziana* M. J. Silva. —A. Flowering branch. —B. Leaflets, abaxial surfaces, with the magnified insert showing the brief strigose indumentum. —C. Floral bud. —D. Secondary bract. —E. Bracteole. —F. Calyx opened out. —G. Standard. —H. Wings. —I. Keel petals. —J. Side view of staminal tube. —K. Staminal tube opened out. —L. Anthers, ventral view to right and dorsal view to left. —M. Gynoecium, with magnified insert showing the dense sericeous indumentum. —N. Fruits. —O. Seed, lateral view. A–M from the holotype *F. E. Miranda et al.* 538 (INPA); N–O from *D. C. Daly et al.* 1585 (K).

obtuse to rounded, or, less commonly, retuse to emarginate, membranaceous to papyraceous, discolorous, adaxial surface bright green, glabrous, abaxial surface pale green, strigulose; venation brochidromous, midvein and secondary veins impressed on

both surfaces, the secondary veins forming angles of 35° to 45° with the midvein. Pseudoracemes axillary, solitary with the flowers in pairs along the rachis, congested; peduncle 2–8 mm, rachis 2–4.4 cm, both angulate, glabrous or shortly tomentose, trichomes



hyaline to yellowish, secretory cavities present; primary bract (at base of inflorescence) caducous, secondary bracts (surrounding the pedicels)  $0.9\text{--}1 \times 0.8\text{--}0.9$  mm, broadly ovate to triangular, base obtuse to truncate, apex acute to obtuse, ferruginous tomentose externally, persistent, tertiary bracts (at base of each pedicel)  $0.3\text{--}0.5$  mm, oblong, base truncate, apex rounded, ferruginous tomentose externally, caducous; bracteoles (situated on upper third of pedicel)  $1\text{--}1.1 \times 0.4$  mm, ovate, base truncate, apex obtuse, opposite, ferruginous tomentose externally; secretory cavities present on the bracts and bracteoles. Flowers purple to lilac, calyx and corolla without secretory cavities; pedicels  $2.9\text{--}3$  mm, subcylindrical, ferruginous-tomentose; calyx  $2.9\text{--}3.1 \times 3\text{--}3.4$  mm, campanulate, subtruncate, subcoriaceous, pubescent externally, slightly gibbous on the vexillary margin; standard  $8.5\text{--}9 \times 7\text{--}7.8$  mm, ovate, base subtruncate to slightly cordate, apex emarginate, basal callosities thickened inside in the middle of the petal, glabrous internally and shortly sericeous on the central-apical region of the dorsal surface, especially along the veins, claw  $2.9\text{--}3$  mm; wings  $7.4\text{--}7.5 \times 3\text{--}3.1$  mm, ovate-falcate, base auriculate on the vexillary margin, apex obtuse, sericeous externally, claw  $3.9\text{--}4$  mm; keel petals  $6\text{--}7 \times 2.9\text{--}3$  mm, ovate-falcate, umbonate above the claw, base truncate on the vexillary margin, apex obtuse, sericeous externally, claw  $3.9\text{--}4$  mm; staminal tube  $7\text{--}7.2 \times 1.8\text{--}1.9$  mm, membranous, slightly bicallose at the base, anthers  $0.7\text{--}0.8$  mm, orbicular to  $\pm$  oblong, pubescent together with the free portion of the filaments and staminal tube; ovary  $7.6\text{--}7.8 \times 1\text{--}1.1$  mm,  $\pm$  narrowly conicoid, slightly curved on the vexillary margin, densely sericeous, without secretory cavities, style  $6.3\text{--}7$  mm, slightly curved, glabrescent, stigma punctiform, sessile; ovules 6 or 7 per ovary, ca.  $0.3$  mm, irregularly reniform; hypanthium ca.  $1$  mm, asymmetric. Pod  $2.1\text{--}5.5 \times 1\text{--}1.3$  cm, 1- to 5-seeded, indehiscent, conspicuously falcate or more rarely oblong-falcate, base cuneate, apex acute to obtuse, upper margin discreetly thickened, glabrescent; calyx and remnants of other floral parts, persistent; seeds 4 or 5,  $2\text{--}2.4$  mm, reniform, light brown.

**Distribution and habitat.** *Muelleria tozziana* is endemic to Brazil, with a disjunct distribution between the states of Pará (Tucuruí, Itupiranga, and adjacent areas), and Mato Grosso (Rio Araguaia). The new species grows in rocky areas and along igapó forest margins or in partially flooded areas, on sandy or clay soils.

**IUCN Red List category.** *Muelleria tozziana* is known from no more than nine localities, eight of

which are in the state of Pará, with only one in the state of Mato Grosso. Following IUCN Red List criteria (IUCN, 2001), the species has been evaluated as Vulnerable (VU D2, with a limited distribution), and the individuals were not abundant where collected.

**Phenology.** The new species was observed to flower in September and October and in fruit from October to February.

**Etymology.** The specific epithet honors Ana Maria Goulart de Azevedo Tozzi, a Brazilian botanist at the Universidade Estadual de Campinas, São Paulo, for her valuable contributions to the knowledge of Brazilian legumes and for introducing me to the beautiful world of the genus *Muelleria*.

**Relationships.** *Muelleria tozziana* is differentiated from its congeneric taxa by its curved, falcate or oblong-falcate fruits, these being slightly thickened along the upper margin and glabrescent. The flowers with the staminal tube, free portion of the filaments and anthers are consistently pubescent; the calyx is subtruncate; the leaves are diminutive, with predominantly orbicular to rounded leaflets, these delicate and glossy on the upper surface. Morphologically the new species resembles *M. denudata* with which it often has been confused in herbarium collections, because in some cases both taxa share a similar number and form of the leaflets and environmental preferences. However, the new species differs from *M. denudata* by the flowers measuring ca.  $10$  mm (vs.  $12.5$  mm in *M. denudata*), by the nearly truncate calyx (vs. a calyx with at least three distinct lobes), the pubescence of the flowers throughout the staminal tube, the free portion of the filaments and anthers (vs. glabrous or only the anthers pubescent), the ovate wings with the base auriculate on vexillary margin (vs. elliptic to oblong-falcate with the base truncate), and curved or falcate to oblong-falcate fruits, which are usually glabrescent (vs. the oblong and densely ferruginous tomentose).

**Paratypes.** BRAZIL. **Mato Grosso:** Rio Araguaia,  $13^{\circ}22'S$ ,  $50^{\circ}40'W$ , 31 Oct. 1978 (fr.), A. A. Dias 42 (RB). **Pará:** Itupiranga, Mata de várzea na margem do rio, 4 Feb. 1976 (fr.), N. T. Silva 4270 (IAN, K not seen, K photo); Ilha do Deserto, Rio Xingu, abaixo do Rio Bacajá, 20 Nov. 1980 (fr.), G. T. Prance, D. G. Campbell, D. C. Daly, U. Maciel, M. G. da Silva, R. P. Bahia & M. R. dos Santos 26358 (K, MICH); Rio Tocantins, 1 km E de Breu Branco, 44 km S de Tucuruí, na antiga BR 422,  $4^{\circ}04'S$ ,  $49^{\circ}38'W$ , 17 Nov. 1981, D. C. Daly, R. Callejas, M. G. da Silva, E. L. Taylor, C. Rosario & M. R. dos Santos 1392 (K, K photo, NY); próx. Igarapé Cajazeirinha, ca. 30 km N de Itupiranga,  $4^{\circ}01'S$ ,  $49^{\circ}21'W$ , 27 Nov. 1981 (fr.), D. C. Daly, R. Callejas, M. G. da Silva, E. L. Taylor, C. Rosario & M. R. dos Santos 1585 (K, K photo, NY); entre Marabá e Tucuruí,



5°00'S, 49°20'W, 23–24 Nov. 1981 (fr.), *J. Jangoux, A. B. Anderson, M. J. Balick, J. M. F. Frazão, L. R. Marinho & N. A. Rosa 1694* (K); BR422, Km. 45, 5 Nov. 1983 (fr.), *J. Ramos 1015* (INPA); 14 Sep. 1983 (fl.), *J. Revilla et al. 8677* (INPA).

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